What is claimed is:

Sub a1 1. A sensor, comprising:

regions of a conductive organic material and a conductive material compositionally different than the conductive organic material, wherein the sensor provides an electrical path through the regions of the conductive organic material and the regions of the conductive material,

the conductive organic material being selected from the group consisting of polyanilines, an emeraldine salt of polyanilines, polypyrroles, polythiophenes, polyEDOTs, and derivatives thereof.

2. The sensor according to claim 1, wherein the conductive material is carbon black.

3. The sensor according to claim 1, further comprising an insulator or plasticizer.

Sub a2 4. A sensor array comprising:

a plurality of sensors; and

a measuring apparatus, wherein the sensors are in communication with the measuring apparatus,

Sub a2

at least one sensor comprising:

regions of a conductive organic material and regions of a conductive material compositionally different than the conductive organic material, wherein the sensor provides an electrical path through the regions of the conductive organic material and the regions of the conductive material,

the sensors constructed to provide a first response when contacted with a first chemical analyte, and a second different response when contacted with a second different chemical analyte.

5. The sensor array of claim 4, wherein the measuring apparatus is an electrical measuring device in electrical communication with at least one sensor.

6. The sensor array according to claim 4, wherein the array comprises a plurality of sensors having regions of an organic conductor and a conductive material compositionally different than the organic material wherein the conductive organic material of at least one sensor is different from the conductive organic material of at least one other sensor.

Sub a3

7. The sensor array according to claim 4, wherein the conductive material is an inorganic conductor.

8. The sensor array according to claim 4, wherein the response is a change in resistance in the sensors.

9. The sensor array according to claim 4, wherein the conductive organic material of the plurality of sensors are compositionally the same or compositionally different.

10. The sensor array according to claim 4, wherein the conductive organic material is selected from the group consisting of polyanilines, an emeraldine salt of polyanilines, polypyrroles, polythiophenes, and polyEDOTs, and the conductive material is selected from the group consisting of Ag, Au, Cu, Pt, carbon black and AuCu.

11. The sensor array according to claim 4 or 10, further comprising a temperature control apparatus, the temperature control apparatus in thermal communication with at least one sensor.

Sub a4

12. The sensor array of according to claim 11, wherein the

Sub a4

resistance of the sensor is R_m at temperature T_m when contacted with a chemical analyte, where m is an integer greater than 1.

13. The sensor array according to claim 4 or 10, wherein the response is a change in impedance.

14. The sensor array according to claim 13, wherein the electrical impedance is Z_m at frequency θ_m when contacted with the first chemical analyte, where m is an integer greater than 1 and θ_m does not equal 0.

15. The sensor array according to claim 14, further comprising a temperature control apparatus in thermal communication with at least one sensor.

16. The sensor array according to claim 15, wherein the impedance is $Z_{m,n}$ at frequency θ_m and temperature T_n when contacted with the first chemical analyte, where m and/or n is an integer greater than 1.

17. The sensor array according to claim 7, wherein the inorganic conductor is a member selected from the group consisting of Ag, Au, Cu, Pt, carbon black, and AuCu.

18. The sensor array according to claim 7, wherein the inorganic conductor is carbon black.

Sub a5

19. An array of sensors according to claim 4, wherein the conductive material is an organic conductor.

20. The sensor array according to claim 4, wherein the conductive material is a member selected from the group consisting of an organic conductor, an inorganic conductor or a mixed inorganic-organic conductor.

21. The sensor array according to claim 4, wherein the conductive material is a member selected from the group consisting of a metal, a metal alloy, a metal oxide, an organic complex, a semiconductor, a superconductor and a mixed inorganic-organic complex.

Sub a6

22. The sensor array according to claim 4, wherein the conductive material is a particle.

23. The sensor array according to claim 4, wherein the conductive material of each or the sensors comprises a conductive organic material.

Sub a6

24. The sensor array according to claim 4, wherein the regions of conductive organic material and the dissimilar conductive material are fabricated from a member selected from the group consisting of a colloid, a suspension or a dispersion.

25. The sensor array according to claim 4, wherein the regions of conductive organic material and conductive material are fabricated from a colloid.

26. A sensor array system comprising:

a plurality of sensors; and

a measuring apparatus, wherein the sensors are in communication with the measuring apparatus,

a computer comprising a resident algorithm,

at least one of the sensors comprising:

regions of a conductive organic material and regions of a conductive material compositionally different than the conductive organic material, wherein each sensor provides an electrical path through the region of the conductive organic material and the conductive material,

the sensors constructed to provide a first response when contacted with a first chemical analyte, and a second different response when contacted with a second different chemical analyte,

wherein the computer processes the difference between the first response and the second response.

27. The sensor array system of claim 26, wherein the measuring apparatus is an electrical measuring device in electrical communication with at least one sensor.

28. The sensor array system according to claim 26, wherein the conductive organic material of at least one sensor is different from the conductive organic material of at least one other sensor.

Sub a7

29. The sensor array system according to claim 26, wherein the conductive material is an inorganic conductor.

30. The sensor array system according to claim 26, wherein the response is a change in resistance in the sensors.

31. The sensor array system according to claim 26, wherein the

conductive organic material of the plurality of sensors are compositionally the same or compositionally different.

32. The sensor array system according to claim 26, wherein the conductive organic material is selected from the group consisting of polyanilines, emeraldine salt of polyanilines, polypyrroles, polythiophenes, and polyEDOTs, and the conductive material is selected from the group consisting of Ag, Au, Cu, Pt, carbon black, and AuCu.

33. The sensor array system according to claim 26 or 32, further comprising a temperature control apparatus, the temperature control apparatus in thermal communication with at least one sensor.

34. The sensor array system according to claim 33, wherein a resistance of the sensor is R_m at temperature T_m when contacted with a chemical analyte, where m is an integer greater than 1.

35. The sensor array system according to claim 26 or 32, wherein the response is a change in impedance.

36. The sensor array system according to claim 35, wherein the

electrical impedance is Z_m at frequency θ_m when contacted with the first chemical analyte, where m is an integer greater than 1 and θ_m does not equal 0.

37. The sensor array system according to claim 36, further comprising a temperature control apparatus in thermal communication with at least one sensor.

38. The sensor array system according to claim 37, wherein the impedance is $Z_{m,n}$ at frequency θ_m and temperature T_n when contacted with the first chemical analyte, where m and/or n is an integer greater than 1.

39. The sensor array system according to claim 29, wherein the inorganic conductor is a member selected from the group consisting of Ag, Au, Cu, Pt, carbon black, and AuCu.

40. The sensor array system according to claim 29, wherein the inorganic conductor is carbon black.

Sub C6

41. The sensor array system according to claim 26, wherein the conductive material is an organic conductor.

42. The sensor array system according to claim 26, wherein the conductive material is a member selected from the group consisting of an organic conductor, an inorganic conductor or a mixed inorganic-organic conductor.

43. The sensor array system according to claim 26, wherein the conductive material is a member selected from the group consisting of a metal, a metal alloy, a metal oxide, an organic complex, a semiconductor, a superconductor and a mixed inorganic-organic complex.

Sub a9

44. The sensor array system according to claim 26, wherein the conductive material is a particle.

45. The sensor array system according to claim 26, wherein each of the sensors comprises a conductive organic material.

46. The sensor array system according to claim 26, wherein the conductive organic material is an organic polymer.

Sub a10

47. The sensor array system according to claim 26, wherein the region of conductive organic material and conductive material is fabricated from a member selected from the group consisting of a

Sub a10 colloid, a suspension or a dispersion.

Sub a11 48. The sensor array system according to claim 26, wherein the region of conductive organic material and conductive material is fabricated from a colloid.

49. The sensor array system according to claim 26, wherein the resident algorithm is a member selected from the group consisting of principal component analysis, Fisher linear analysis, neural networks, genetic algorithms, fuzzy logic, pattern recognition, and combinations thereof.

50. A method for detecting the presence of an analyte in a sample, the method comprising:

sensing the presence of an analyte in a sample with a sensor array comprising a plurality of sensors each comprising regions of a conductive organic material and a conductive material compositionally different than the conductive organic material, each resistor providing an electrical path through the regions of conducting organic material and the conductive material, a first response when contacted with a first sample comprising a first chemical analyte and a second different response when contacted with a second sample comprising a second

different chemical analyte.

51. The method of claim 50, wherein the measuring apparatus is an electrical measuring device in electrical communication with at least one sensor.

52. The method according to claim 50, wherein the conductive organic material of at least one sensor is different from the conductive organic material of at least one other sensor.

Sub a18 53. The sensor array according to claim 50, wherein the conductive material is an inorganic conductor.

54. The method according to claim 50, wherein the response is a change in resistance in the sensors.

55. The method according to claim 50, wherein the conductive organic material of the plurality of sensors are compositionally the same or compositionally different.

56. The method according to claim 50, wherein the conductive organic material is selected from the group consisting of polyanilines, emeraldine salt of polyanilines, polypyrroles,

polythiophenes, and polyEDOTs, and the conductive material is selected from the group consisting of Ag, Au, Cu, Pt, carbon black, and AuCu.

57. The method according to claim 50 or 56, further comprising a temperature control apparatus, the temperature control apparatus in thermal communication with at least one sensor.

58. The method according to claim 57, wherein a resistance of the sensor is R_m at temperature T_m when contacted with a chemical analyte, where m is an integer greater than 1.

59. The method according to claim 50 or 56, wherein the response is a change in impedance.

60. The method according to claim 59, wherein the electrical impedance is Z_m at frequency θ_m when contacted with the first chemical analyte, where m is an integer greater than 1 and θ_m does not equal 0.

61. The method according to claim 60, further comprising a temperature control apparatus in thermal communication with at least one sensor.

62. The method according to claim 61, wherein the impedance is $Z_{m,n}$ at frequency θ_m and temperature T_n when contacted with the first chemical analyte, where m and/or n is an integer greater than 1.

63. The method according to claim 53, wherein the inorganic conductor is a member selected from the group consisting of Ag, Au, Cu, Pt, carbon black and AuCu.

64. The method according to claim 53, wherein the inorganic conductor is carbon black.

Sub a13

65. An method according to claim 50, wherein the conductive material is an organic conductor.

66. The method according to claim 50, wherein the conductive material is a member selected from the group consisting of an organic conductor, an inorganic conductor or a mixed inorganic-organic conductor.

67. The method according to claim 50, wherein the conductive material is a member selected from the group consisting of a metal, a metal alloy, a metal oxide, an organic complex, a

semiconductor, a superconductor and a mixed inorganic-organic complex.

Sub a14 68. The method according to claim 50, wherein the conductive material is a particle.

69. The method according to claim 50, wherein the array comprises a plurality of sensors having a conductive organic material.

Sub a15 70. The method according to claim 50, wherein the region of conductive organic material and conductive material is fabricated from a member selected from the group consisting of a colloid, a suspension or a dispersion.

71. The method according to claim 50, wherein the region of conductive organic material and conductive material is fabricated from a colloid.

72. A method for detecting a microorganism, the method comprising:

exposing an analyte associated with the microorganism to a sensor array comprising a plurality of sensors electrically

Sub a15 connected to an measuring apparatus, wherein each of the sensors comprises regions of conducting organic material and regions of conducting material compositionally different than the conducting organic material; and

measuring a response through the regions of conducting organic material and the compositionally dissimilar conducting material, thereby detecting the microorganism.

7~~3~~. A system for identifying a microorganism, the system comprising:

a sensor array comprising a plurality of sensors connected to an measuring apparatus, wherein each of the sensors comprises regions of conducting organic material and regions of conducting material compositionally different than the conducting organic material; and

a computer comprising a resident algorithm;

the measuring apparatus capable of detecting a response from the each sensor and the computer capable of assembling the responses into a response profile for microorganism identification.

74. The system for identifying a microorganism in accordance with claim 73, wherein the resident algorithm of the computer is a member selected from the group consisting of principal

component analysis, Fisher linear analysis, neural networks, genetic algorithms, fuzzy logic, pattern recognition, and combinations thereof.

75. The system for identifying a microorganism in accordance with claim 73, further comprising the steps of:

providing an information storage device coupled to the measuring apparatus; and

storing information in the information storage device.

76. The system for identifying a microorganism in accordance with claim 73, wherein the measuring apparatus includes a digital-analog converter.

77. A system for detecting an analyte in a sample to be tested, comprising:

a substrate having a plurality of sensors that incorporates a conductive material and a conductive organic material and that provides a response that varies according to the presence of an analyte in contact with it;

a detector operatively associated with the sensor, for measuring the response of the sensor;

a sample delivery unit for delivering the sample to be tested to

the sensor; and

an information storage and processing device configured to store an ideal response for a predetermined analyte and to compare the response of the sensor with the stored ideal response, to detect the presence of the analyte in the sample being tested.

78. The system in accordance with claim 77, wherein the information storage and processing device is configured to store ideal responses for a plurality of predetermined analytes; and the information storage and processing device further is configured to compare the response of the sensor with the plurality of stored ideal responses, to detect the presence of each analyte in the fluid being tested.

79. The system in accordance with claim 77, wherein the sample to be tested is a liquid; and

the sample delivery unit comprises

a flow passage interconnecting the sensor with a mixture containing the liquid to be tested,

a gas-permeable, liquid-impermeable shield interposed in the flow passage, and

a device for extracting vapor from the liquid to be tested and for delivering the extracted vapor along the flow passage to the

sensor.

80. The system in accordance with claim 77, wherein the sample to be tested is gaseous; and
the sample delivery unit comprises
a wand defining a gas flow passage, and
a pump for pumping the gaseous sample to the sensor via the gas flow passage of the wand.

81. The system in accordance with claim 77, wherein the sample to be tested is a vapor extracted from a solid to be tested; and
the sample delivery unit comprises
a wand defining a vapor flow passage, and
a pump for pumping the vapor extracted from the solid to be tested to the sensor via the vapor flow passage of the wand.

82. The system in accordance with claim 77, wherein the detector is optimized to detect a member selected from the group consisting of electromagnetic energy, optical properties, resistance, capacitance, inductance, impedance and combinations thereof.

83. The system in accordance with claim 77, wherein the analyte

is detected in an application which is a member selected from the group consisting of environmental toxicology, remediation, biomedicine, material quality control, food monitoring, agricultural monitoring, heavy industrial manufacturing, ambient air monitoring, worker protection, emissions control, product quality testing, oil/gas petrochemical applications, combustible gas detection, H_2S monitoring, hazardous leak detection, emergency response and law enforcement applications, explosives detection, utility and power applications, food/beverage/agriculture applications, freshness detection, fruit ripening control, fermentation process monitoring and control, flavor composition and identification, product quality and identification, refrigerant and fumigant detection, cosmetic/perfume applications, fragrance formulation, chemical/plastics/pharmaceuticals applications, fugitive emission identification, solvent recovery effectiveness, hospital/medical applications, anesthesia and sterilization gas detection, infectious disease detection, breath analysis and body fluids analysis.

84. The system in accordance with claim 77, wherein the array of sensors comprises a member selected from the group consisting of a surface acoustic wave sensor, a quartz microbalance sensor; a

conductive composite; a chemiresistor; a metal oxide gas sensor and a conducting polymer sensor, a dye-impregnated polymer film on fiber optic detector, a polymer-coated micromirror, an electrochemical gas detector, a chemically sensitive field-effect transistor, a carbon black-polymer composite, a micro-electro-mechanical system device and a micro-opto-electro-mechanical system device.

85. A method for detecting a disease in a subject, the method comprising,

contacting an array of sensors with a biological sample suspected of containing an analyte indicative of the disease, wherein each sensor comprises regions of a conductive organic material and a conductive material compositionally different that the conductive organic material; and

detecting the analyte wherein the presence of the analyte is indicative of the disease.

86. A method in accordance with claim 85, wherein the array of sensors comprises a member selected from the group consisting of a surface acoustic wave sensor; a quartz microbalance sensor; a conductive composite; a chemiresistor; a metal oxide gas sensor and a conducting polymer sensor, a dye-impregnated polymer film

on fiber optic detector, a polymer-coated micromirror, an electrochemical gas detector, a chemically sensitive field-effect transistor, a carbon black-polymer composite, a micro-electro-mechanical system device and a micro-opto-electro-mechanical system device.

87. The method in accordance with claim 85, further comprising generating a response from the sensors and inputting the response to a neural net trained against known analytes.

88. The method in accordance with claim 85, wherein the disease is selected from the group consisting of halitosis, periodontal disease, pneumonia, vaginitis, uremia, trimethylaminuria, lung cancer, dysgensia, dysosnia, cytinuria, and bacterial vaginosis.

89. A method in accordance with claim 85, wherein the analyte is an off gas of a member selected from the group consisting of Prevotella intermedia, Fusobacterium nucleatum, Porphyromonas gingivalis, Porphyromonas endodontalis, Prevotella loescheii, Hemophilus parainfluenzae, Stomatococcus muci, Treponema denticola, Veillonella species, Peptostreptococcus anaerobius, Micros prevotii, Eubacterium limosum, Centipeda periodontii, Selemonad aremidis, Eubacterium species, Bacteriodes species,

Fusobacterium periodonticum, Prevotella melaninogenica, Klebsiella pneumoniae, Enterobacter cloacae, Citrobacter species and Stomatococcus mucilaginus.

90. The method in accordance with claim 85, wherein the biological sample is a subject's breath, vaginal discharge, urine, feces, tissue sample, or blood sample.